

DERWENT-ACC-NO: 1992-376736

DERWENT-WEEK: 199246

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TITLE: Mfr. of diamond coated ceramic component - comprises  
etching machined silico nitride using hydrogen fluoride  
or hydrogen fluoride and inert gas and forming gas phase  
synthetic diamond surface layer

PATENT-ASSIGNEE: MITSUBISHI MATERIALS CORP[MITV]

PRIORITY-DATA: 1991JP-0059619 (March 1, 1991)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 04276077 A	October 1, 1992	N/A	004	C23C 016/26

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 04276077A	N/A	1991JP-0059619	March 1, 1991

INT-CL (IPC): C04B041/91, C23C016/02, C23C016/26, C30B029/04

ABSTRACTED-PUB-NO: JP 04276077A

BASIC-ABSTRACT:

Mfr. comprises, etching the surface of silicon nitride using HF gas; and forming the gas phase synthetic diamond phase on the etched surface. The etching medium is pref. a mixt. of aq. HF and aq. halogenated hydrogen, or of a mixt. of HF gas and inert gas.

USE/ADVANTAGE - A diamond coating is formed on the ceramic material having good anti-peeling characteristic. In an example, a commercially available silicon nitride (Si<sub>3</sub>N<sub>4</sub>-5 wt.%Y<sub>2</sub>O<sub>3</sub>-3wt.%Al<sub>2</sub>O<sub>3</sub>) was machined to prepare specimen of the shape of ISO SPGN120308. The specimen was dipped into aq.5% HF for 10min. to etch. The dried etched specimen was heated by W filament in a quartz tube (120 mm length) to 800 deg.C to 30 hrs. in the gas of CH<sub>4</sub>/H<sub>2</sub>=0.01, 20Torr to form the diamond film (12 micron thick) on the surface. The prepd. specimen was used as cutting tool to test for dry milling at 2 mm of cutting depth on a work of Al-18%Si. The tool gave superior surface precision on the work as long as 49 min. of continuous cutting.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: MANUFACTURE DIAMOND COATING CERAMIC COMPONENT COMPRISE ETCH  
MACHINING SILICO NITRIDE HYDROGEN FLUORIDE HYDROGEN FLUORIDE INERT  
GAS FORMING GAS PHASE SYNTHETIC DIAMOND SURFACE LAYER

ADDL-INDEXING-TERMS:  
CARBON8

DERWENT-CLASS: E36 L02 M13

CPI-CODES: E31-N03; L02-H04; L02-J02;

CHEMICAL-CODES:

Chemical Indexing M3 \*01\*  
Fragmentation Code  
C106 C810 M411 M720 M903 M904 M910 Q451 Q464  
Specific Compounds  
01776P  
Registry Numbers  
92407

UNLINKED-DERWENT-REGISTRY-NUMBERS: 1712S; 1776P

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1992-167226

DERWENT-ACC-NO: 1992-368535

DERWENT-WEEK: 199245

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TITLE: Ceramic cutting tool with anti-peeling composite diamond coating - comprises ceramic base with intermediate amorphous carbon film contg. fluorine and hydrogen and vapour phase-synthesised diamond film

PATENT-ASSIGNEE: MITSUBISHI MATERIALS CORP[MITV]

PRIORITY-DATA: 1991JP-0047593 (February 20, 1991)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
JP 04268076 A	September 24, 1992	N/A	006	C23C 016/22

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
JP 04268076A	N/A	1991JP-0047593	February 20, 1991

INT-CL (IPC): B23B027/14, C23C016/22, C23C016/26, C30B029/04

ABSTRACTED-PUB-NO: JP 04268076A

BASIC-ABSTRACT:

Ceramic base material is coated with intermediate layer of amorphous carbon film contg. 1-30at.% of F and 1-30at.% of H, and is further coated by gas phase-synthesised diamond film. The intermediate layer is pref. 0.1-10 micron thick. The ceramic base material is pref. a silicon nitride ceramic.

USE/ADVANTAGE - Provides excellent cutting tool having high anti-peeling, composite diamond coating.

In an example, a commercial silicon nitride ceramic material was machined to form a tip conforming to ISO SPGN 120308. The tip was etched to prepare the base material of Si<sub>2</sub>N<sub>4</sub>-5%Y<sub>2</sub>O<sub>3</sub>-3%Al<sub>2</sub>O<sub>3</sub> under the condition of 0.05Tor, 100W of RF power, CF<sub>4</sub> gas, 50 sccm gas flow rate, and 20min. treatment. The tip was then subjected to amorphous carbon film synthesis under the condition of 0.2Torr, 80W of RF power, CH<sub>4</sub> + 20%HF, 20 sccm of gas flow rate. The amorphous carbon film was further coated by the gas phase synthesis diamond film 5 microns thick in microwave plasma unit under the condition of 30Torr, 600W of microwave power, 1%CH<sub>4</sub> + H<sub>2</sub>, and 100 sccm gas flow rate. The prepd. tip was used as the cutting tool for dry milling under the condition of Al-18%Si of work, 500m/min. cutting speed, 0.5mm cutting depth, and 0.3mm/rev. feed. The peeling of diamond film occurred after 36min. of cutting.

CHOSEN-DRAWING: Dwg.0/0

TITLE-TERMS: CERAMIC CUT TOOL ANTI PEEL COMPOSITE DIAMOND COATING COMPRISE CERAMIC BASE INTERMEDIATE AMORPHOUS CARBON FILM CONTAIN FLUORINE HYDROGEN VAPOUR PHASE SYNTHESIS DIAMOND FILM

DERWENT-CLASS: L02 M13 P54

CPI-CODES: L02-F05; L02-H02B2; L02-J02C; M13-E02;

UNLINKED-DERWENT-REGISTRY-NUMBERS: 0323S; 1532U ; 1712U ; 1776P

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1992-163660

Non-CPI Secondary Accession Numbers: N1992-280904